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PATENT **00AB074/ALBRP196US**

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Date: 10-3-05

Himanshu S. Amin

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:			
Applicant(s):	Bret S. Hildebran, *et al.*	Examiner:	Chieh M. Fan
Serial No:	09/675,928	Art Unit:	2634
Filing Date:	September 29, 2000		

Title: LOW OVERHEAD SYNCHRONIZED ACTIVATION OF FUNCTIONAL MODULES

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APPEAL BRIEF

Dear Sir:

Applicant's representative submits this brief in connection with an appeal of the above-identified patent application. A credit card payment form is filed concurrently herewith in connection with all fees due regarding this appeal brief. In the event any additional fees may be due and/or are not covered by the credit card, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [ALBRP196US].

I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in the present appeal is Rockwell Technologies LLC, the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))

Appellant, appellant's legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))

Claims 1-28 are currently pending in the subject application and are presently under consideration. Claims 1-6, 8, 11-21 and 26-28 stand rejected by the Examiner. The rejection of claims 1-6, 8, 11-21 and 26-28 is being appealed.

IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))

No amendments have been entered subsequent the Final Office Action dated April 5, 2005.

V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))

A. Independent Claim 1

Independent claim 1 recites a system for synchronizing a sampling interval at an industrial control module comprising a controller for providing to a communications link a coordinated system time base signal having a value indicative of a coordinated system time, and a module operatively connected to the communications link, the module having an activation interval for controlling periodic activation relative to at least one of an input and an output thereof, wherein the module is programmed to synchronize the activation interval thereof relative to the coordinated system time base value.
(*See e.g.*, pp 7-8, ll. 19-2).

B. Independent Claim 13

Independent claim 13 recites a module for use in an industrial controller system comprising a communications link for receiving a coordinated system time base signal having a value indicative of a coordinated system time, and a field side for at least one of sampling input data and applying output data, wherein the module is programmed to control activation of the field side based on an activation interval value, the module synchronizing the activation interval for the field side relative to the coordinated system time base value. (*See e.g.*, pp 7-8, ll. 19-2).

C. Independent Claim 18

Independent claim 18 recites a system for providing synchronized sampling at an industrial control module comprising means for receiving a coordinated system time base signal at the module having a value indicative of a coordinated system time, and means for synchronizing an activation interval of the module relative to the coordinated system time base value. (*See e.g.*, pp 7-8, ll. 19-2).

The "means for" limitations described above are identified as limitations subject to the provisions of 35 U.S.C. §112 ¶6. The structures corresponding to these limitations are identified with reference to the specification and drawings in the above noted parentheticals.

D. Independent Claim 19

Independent claim 19 recites a method for synchronizing sampling of a module relative to a common time base, the module having an interval for controlling periodic activation relative to at least one of an input and an output thereof, the method comprising the steps of receiving a coordinated system time base signal having a value indicative of a coordinated system time, and synchronizing the activation interval of the module relative to the coordinated system time base value. (*See e.g.*, pp 7-8, ll. 19-2).

VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

A. Claims 1-6, 8, 11-21 and 26-28 stand rejected under 35 U.S.C. §102(b) as being anticipated by DiCarlo (US 5,519,726).

B. Claims 1-6, 8, 11-21 and 26-28 stand rejected under 35 U.S.C. §102(b) as being anticipated by Husted *et al.* (US 5,887,029).

C. Claims 7 and 22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over DiCarlo in view of Benson *et al.* (U.S. 6,202,085).

D. Claims 7 and 22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Husted *et al.* in view of Benson *et al.*

E. Claims 9, 10, 24 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over DiCarlo in view of Ernst (EP 0385134).

F. Claims 9, 10, 24 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Husted *et al.* in view of Ernst.

VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

A. Rejection of Claims 1-6, 8, 11-21, and 26-28 Under 35 U.S.C. §102(e)

Claims 1-6, 8, 11-21 and 26-28 stand rejected under 35 U.S.C. §102(b) as being anticipated by DiCarlo (US 5,519,726). Reversal of this rejection is requested for at least the following reasons. DiCarlo does not teach or suggest each and every limitation set forth in the subject claims.

> A single prior art reference anticipates a patent claim only if it ***expressly or inherently describes each and every limitation set forth in the patent claim.*** *Trintec Industries, Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 63 USPQ2d 1597 (Fed. Cir. 2002); *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ***The identical invention must be shown in as complete detail as is contained in the ... claim.*** *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) (emphasis added).

The subject invention relates to a system and method for synchronizing the sampling times of a plurality of modules in a controller. A coordinated system time (CST) is a time stamp provided by a master module to provide a common time base for use by all modules in the controller. (*See* pg. 7, ll. 1-0035). A memory component is located within each module, and stores a real time sampling RTS value, (*see* Fig. 2), which indicates a sampling time interval of the module. (*See* pg. 7, ll. 19-26). The CST signal is broadcast to each module relatively infrequently, several times per second for example, to conserve the bandwidth of the backplane. (*See* pg. 8, ll. 30-31). Alternatively, the RTS value is broadcast more frequently. (*See* pg. 8-9, ll. 29-4). The subject invention accomplishes module sampling synchronization by delaying a sampling action in a module until the CST reaches an integer multiple of the RTS value. (*See* pg. 9, ll. 22-25).

A synchronization example can be found at page 11 of the instant specification. By way of example, if the RTS time interval is 100 milliseconds and the current CST value is 108,699 milliseconds, the module delays sampling until a CST value of 200,000 microseconds (which is two times the RTS time value). Advantageously, if a subsequent module is connected to the same backplane and configured to employ the same RTS time (100 milliseconds), the subsequent module, in accordance with the subject invention, will automatically synchronize to a substantially similar sampling rate by employing the same procedure (*e.g.*, delay sampling until X * 100,000 microseconds, where X is an integer).

To the above ends, independent claim 1 recites a module operatively connected to the communications link, ***the module having an activation interval*** for ***controlling periodic activation*** relative to at least one of an input and an output thereof, wherein ***the module is programmed to synchronize the activation interval*** thereof relative to the coordinated system time base value. Independent claim 13 recites a communications link for receiving a coordinated system time base signal having a value indicative of a coordinated system time, and a field side for at least one of sampling input data and applying output data, wherein the ***module is programmed to control activation of the field side based on an activation interval value***, the module synchronizing the activation interval for the field side relative to the coordinated system time base value. Independent claim 18 recites means for receiving a coordinated system time base signal at the module

having a value indicative of a coordinated system time, and means for ***synchronizing an activation interval of the module*** relative to the coordinated system time base value. Independent claim 19 recites receiving a coordinated system time base signal having a value indicative of a coordinated system time, and ***synchronizing the activation interval of the module*** relative to the coordinated system time base value. DiCarlo does not teach or suggest each and every aspect of the invention as claimed.

DiCarlo relates to the synchronization of modules based in part upon a coordinated system time. DiCarlo, however, achieves module synchronization in a manner that significantly differs from that of the invention as claimed. More particularly, DiCarlo is silent with regard to a ***module having an activation interval***. In the Office Action dated September 7, 2004, the Examiner incorrectly asserts that such claim aspects are disclosed at Fig. 3, element 14, and col. 3, ll. 57-60, citing that modules within a rack that may include, for example, a power supply module, a processor module, two communication modules, two I/O modules, and a power supply module. It seems that by the disclosure of different *types* of modules, the Examiner asserts that DiCarlo discloses a module having an activation interval. However, such an assertion clearly lacks the element of an ***activation interval***, an element to which DiCarlo is silent. Thus, the Examiner is failing to afford the claim element ***module having an activation interval*** patentable weight.

Furthermore, DiCarlo does not anticipate a module having an activation interval ***for controlling periodic activation***. DiCarlo teaches a method of synchronization controlled in part by time quality messages broadcast system-wide. As disparate modules have disparate internal clocks, the clock having the highest quality value determines the time value of the controller, and other modules update their clocks in accordance with the highest quality clock. (*See* col. 2, ll. 33-53). Module scan synchronization is then accomplished by a command sent to the module. The command received by the module is made up of a command element that indicates an operation to be performed, and a time-based element that indicates some future CST value that the command element is to occur. (See cols. 5-6, ll. 65-25). Thus, it is clear that DiCarlo discloses the activation and synchronization of a module by means of an *external command* to the module.

Since DiCarlo discloses activation of a module exclusively by *external* means, DiCarlo is clearly precluded from disclosing activation of a module by means *internal* to the module as set forth in the subject claims. Alternatively stated, DiCarlo is silent with regard to a ***module ... for controlling periodic activation***. Thus, DiCarlo does not teach or suggest each and every element of the invention as recited in the subject claims.

DiCarlo is further silent with regard to a ***module programmed to synchronize*** the activation interval thereof to the coordinated system time base value as recited in the subject claims. More particularly, as discussed *supra*, the modules of the subject invention have an RTS value stored in the module memory. (*See* pg. 7, ll. 19-26). The RTS value is the value of the sampling interval (*see* pg. 7, ll. 19-26) and is a *programmable* value. (See pg. 5, ll. 27-30). Such programmability is apparent in the example offered above, namely if a subsequent module is connected to the same backplane and *configured to employ the same RTS time* (*e.g.* 100 milliseconds), the subsequent module, in accordance with the subject invention, *will automatically synchronize*. DiCarlo nowhere teaches a ***module programmed to synchronize*** the activation interval thereof to the coordinated system time base value.

More particularly, it has been made readily apparent from the above discussion that DiCarlo accomplishes module synchronization by a command *external* to the module, and that DiCarlo is silent with regard to a *module having an internal activation interval*. As such, the modules in DiCarlo are *controlled* in a manner that synchronizes module sampling; they are not ***programmed*** to synchronize module sampling. To elucidate, it is not accurate to assert that a processor issuing a command to a module *programs* the module since the processor is *controlling*, rather than *programming*, the module. In the alternative, a user configuring a module to sample at a certain interval *programs* the module for that certain rate. Because DiCarlo *controls* rather than *programs* a module, it is readily apparent that DiCarlo fails to teach or suggest a ***module programmed to synchronize*** the activation interval thereof to the coordinated system time base value. Thus, DiCarlo does not disclose the invention as claimed.

In view of at least the foregoing, it is readily apparent that DiCarlo fails to teach or suggest each and every element of the subject invention. Thus, it is respectfully submitted that the rejection to independent claims 1, 13, 18, and 19 (and claims 2-6, 8,

11-12, 14-17, 20-21, and 26-28 which respectively depend there from) should be reversed.

B. **Rejection of Claims 1-6, 8, 11-21, and 26-20 Under 35 U.S.C. §102(e)**

Claims 1-6, 8, 11-21 and 26-28 stand rejected under 35 U.S.C. §102(b) as being anticipated by Husted *et al.* (US 5,887,029). Reversal of this rejection is requested for at least the following reasons. Husted *et al.* does not teach or suggest each and every element of the invention as claimed.

Husted *et al.*, like DiCarlo, teaches module sampling synchronization in a controller. Husted *et al.* accomplishes such module synchronization in similarly to DiCarlo, and thus teaches a drastically different method than the one disclosed by the subject invention. In more detail, Husted *et al.* discloses that precisely coordinated actions may be obtained at separated components by the use of a *time conditional command*, the command instructing the component to execute the command only when a future execution time has been reached. (*See* Abstract). The cited reference fails to teach or suggest a module operatively connected to the communications link, ***the module having an activation interval for controlling periodic activation*** relative to at least one of an input and an output thereof, wherein ***the module is programmed to synchronize the activation interval*** thereof relative to the coordinated system time base value as recited in independent claim 1 (and similarly in independent claims 13, 18, and 19).

Husted *et al.* fails to teach or suggest each and every element of the invention as claimed due to deficiencies similar to those of DiCarlo. First, since Husted *et al.* relies upon sampling times explicitly based upon commands sent to a module, it is silent with regard to ***the module having an activation interval.*** Next, because the synchronization is accomplished *via* a command external to the module, Husted *et al.* fails to teach or suggest the ***module ... for controlling periodic activation.*** Finally, considering that Husted *et al.* teaches module synchronization *via* external *control* rather than internal *programming*, the reference is silent with regard that a ***module is programmed to synchronize the activation interval.*** Thus, Husted *et al.* fails to teach or suggest each and every element of the invention as claimed. Accordingly, it is respectfully requested that

the rejection to independent claims 1, 13, 18, and 19 (and claims 2-6, 8, 11-12, 14-17, 20-21, and 26-28 which respectively depend there from) should be reversed.

C. **Rejection of Claims 7 and 22 Under 35 U.S.C. §103(a)**

Claims 7 and 22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over DiCarlo in view of Benson *et al.* (U.S. 6,202,085). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Neither DiCarlo nor Benson *et al.* individually or in combination, teach or suggest all limitations recited in the subject claims.

Claims 7 and 22 depend from independent claims 1 and 19, respectively, and Benson does not make up for the aforementioned deficiencies of DiCarlo regarding these claims. Benson relates a system and method for incremental change synchronization among multiple copies of data, (*see* Abstract), and does not teach or suggest applicants' claimed invention. Accordingly, reversal of this rejection is respectfully requested.

D. **Rejection of Claims 7 and 22 Under 35 U.S.C. §103(a)**

Claims 7 and 22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Husted *et al.* in view of Benson *et al.* It is respectfully submitted that this rejection should be reversed for at least the following reasons. Benson *et al.* does not make up for the aforementioned deficiencies of Husted *et al.* regarding claims 1 and 19, from which claims 7 and 22 respectively depend. Thus, the cited art, either individually or in combination, fails to teach or suggest all the limitations recited in the subject claims. Accordingly, applicants' representative respectfully requests reversal of this rejection.

E. **Rejection of Claims 9, 10, 24 and 25 Under 35 U.S.C. §103(a)**

Claims 9, 10, 24 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over DiCarlo in view of Ernst (EP 0385134). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Ernst fails to make up for the aforementioned deficiencies of DiCarlo with respect to independent claims 1 and 19, from which claims 9, 10, 24, and 25 respectfully depend. Specifically, Ernst teaches a resynchronization method that tests whether the difference between the

clock signal and a reference clock signal exceeds a specified threshold without even considering the system and method of control module synchronization disclosed in the subject claims. Hence, neither DiCarlo nor Ernst, either individually or in combination, teach or suggest all the limitations as recited in the subject claims. Reversal of this rejection is respectfully requested

F. Rejection of Claims 9, 10, 24 and 25 Under 35 U.S.C. §103(a)

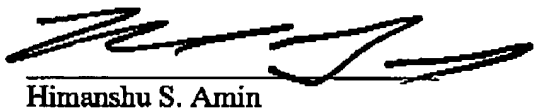
Claims 9, 10, 24 and 25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Husted *et al.* in view of Ernst. Applicants' representative respectfully submits that Ernst fails to make up for the aforementioned deficiencies of Husted *et al.* regarding independent claims 1 and 19 (of which the subject claims respectively depend there from). Accordingly, reversal of this rejection is respectfully requested.

G. **Conclusion**

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the rejections of claims 1-5 and 7-20 be reversed.

If any additional fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [ALBRP196US].

Respectfully submitted,
AMIN & TUROCY, LLP



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VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. A system for synchronizing a sampling interval at an industrial control module comprising:

a controller for providing to a communications link a coordinated system time base signal having a value indicative of a coordinated system time; and

a module operatively connected to the communications link, the module having an activation interval for controlling periodic activation relative to at least one of an input and an output thereof;

wherein the module is programmed to synchronize the activation interval thereof relative to the coordinated system time base value.

2. The system of claim 1, wherein the activation interval corresponds to a sampling interval for controlling periodic sampling of at least one input of the module.

3. The system of claim 1, wherein the activation interval corresponds to application interval for controlling periodic application of at least one output of the module.

4. The system of claim 1, wherein the communications link includes at least one of a backplane and a network infrastructure.

5. The system of claim 1 further including a plurality of spatially separated modules operatively connected to the communications link, each of the modules having an activation interval for controlling at least one of periodic sampling of at least one input thereof and periodic applying of data to at least one output, each module synchronizing the activation interval thereof relative to the coordinated system time base value so that the activation interval of each module is coordinated with respect to a common time base.

6. The system of claim 1, wherein the activation interval is user-configurable.

7. The system of claim 1, wherein the module is further programmable to disable synchronized activation thereof, when synchronized activation is disabled, the module initiating periodic activation relative to at least one of an input and an output thereof sampling arbitrarily.

8. The system of claim 1, wherein the module is further programmed to periodically resynchronize the activation interval thereof relative to the coordinated system time base value.

9. The system of claim 8, wherein the resynchronization occurs in response to determining that the periodic activation is occurring at a time relative to the coordinated system time base that is outside of an expected range.

10. The system of claim 9, wherein the resynchronization occurs by delaying subsequent activation at the module until coordinated system time is a multiple of the activation interval at the module.

11. The system of claim 1, wherein the module is programmed to initiate synchronization of the activation relative to the coordinated system time base value by delaying sampling at the module until coordinated system time is a multiple of the activation interval at the module.

12. The system of claim 11, wherein the module is programmed to initiate synchronization by delaying activation at the module until the coordinated system time is an integer multiple of the activation interval.

13. A module for use in an industrial controller system comprising:

a communications link for receiving a coordinated system time base signal having a value indicative of a coordinated system time; and

a field side for at least one of sampling input data and applying output data;

wherein the module is programmed to control activation of the field side based on an activation interval value, the module synchronizing the activation interval for the field side relative to the coordinated system time base value.

14. The system of claim 13, wherein the module is further programmed to initiate synchronization of the activation by delaying activation of the field side until coordinated system time has a value that is a multiple of the sampling interval value.

15. The system of claim 14, wherein the activation interval value is a predetermined user-configurable value.

16. The system of claim 13, wherein the field side includes an input, the activation interval defining a sampling interval for the input.

17. The system of claim 13, wherein the field side includes an output, the activation interval defining an application interval for applying data to the output.

18. A system for providing synchronized sampling at an industrial control module comprising:

means for receiving a coordinated system time base signal at the module having a value indicative of a coordinated system time; and

means for synchronizing an activation interval of the module relative to the coordinated system time base value.

19. A method for synchronizing sampling of a module relative to a common time base, the module having an interval for controlling periodic activation relative to at least one of an input and an output thereof, the method comprising the steps of:

receiving a coordinated system time base signal having a value indicative of a coordinated system time; and

synchronizing the activation interval of the module relative to the coordinated system time base value.

20. The method of claim 19, wherein a plurality of modules receive the coordinated system time base signal and synchronize periodic activation thereof relative to the coordinated system time base value so that the periodic activation at each module is coordinated relative to the common time base.

21. The method of claim 19 further including programming the activation interval with a user-selected value.

22. The method of claim 19 further including programming the module to enable or disable the step of synchronizing.

23. The method of claim 19 further including periodically resynchronizing the activation of the module relative to the coordinated system time.

24. The method of claim 23, wherein the resynchronization occurs in response to determining that the periodic activation is occurring at a time relative to the coordinated system time that is outside of an accepted range.

25. The method of claim 24, wherein the step of resynchronizing further includes delaying subsequent activation at the module until the coordinated system time is a multiple of the sampling interval.

26. The method of claim 19, wherein the step of synchronizing further includes delaying initial activation at the module until the coordinated system time is a multiple of the sampling interval.

27. The method of claim 19, wherein the activation interval is a sampling interval for controlling periodic sampling of at least one input of the module.

28. The method of claim 19, wherein the activation interval is an application interval for control periodic applying of data to at least one output of the module.

IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.